Trend Study 18-32-02

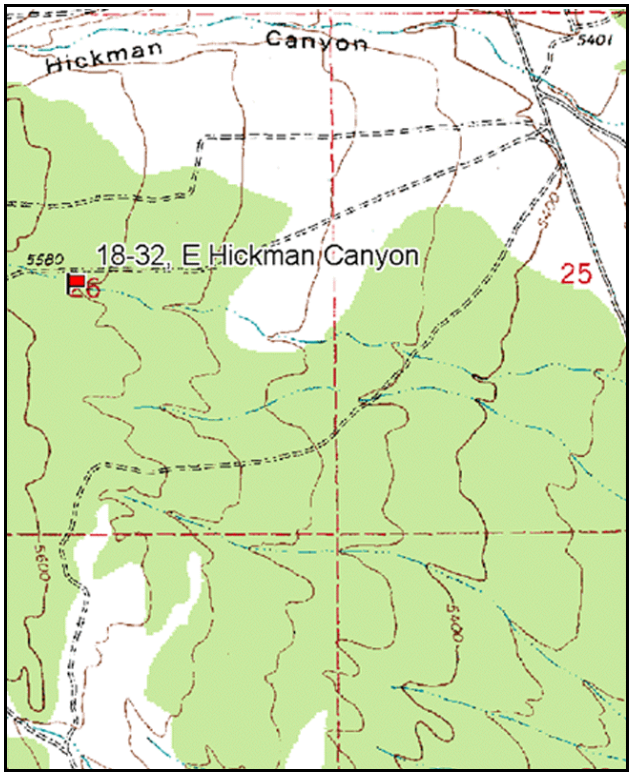
Study site name: East Hickman Canyon . Vegetation type: Chained, seeded P-J .

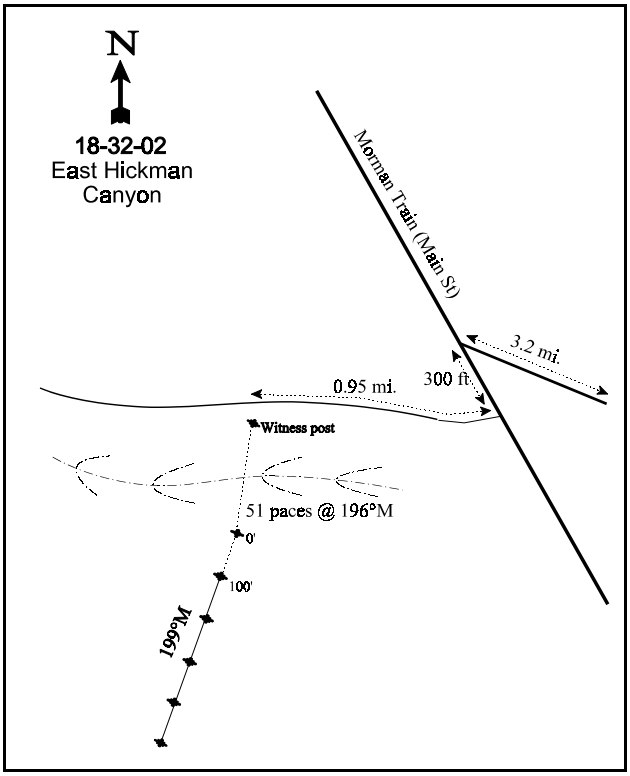
Compass bearing: frequency baseline 199 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Turn west in Stockton on "silver" street. Follow this road around the lake 3.95 miles to a dead end sign and a dirt road on the right. Turn right (west) on this road and go 3.2 miles to a paved road. Turn left (south)for about 300 feet to another road. Turn right (west) on this road and drive 0.95 miles to a witness post on the left. From the witness post walk 51 paces across the gully at 196 degrees magnetic to the 0-foot stake. The study is marked by green, steel fenceposts 12-18 inches in height. The 0-foot stake is marked by browse tag # 440. In 2002 the site had to be reached by driving up East Hickman Canyon, crossing the creek and driving in from the west.





Map name: South Mountain

Diagrammatic Sketch

Township 4S , Range 6W , Section 26

GPS: NAD 27, UTM 12S 4477583 N 373607 E

DISCUSSION

East Hickman Canyon - Trend Study No. 18-32

The East Hickman Canyon site was established in 1997 to get pretreatment data for a pinyon & juniper chaining project. The site once supported a thick pinyon and juniper woodland with a poor understory. A large chaining and seeding project was completed in 1999. The site has a slope of 3-5% with a slight north aspect and elevation of 5,500 feet. Deer use was very light in 1997, with a pellet group frequency of 13%, while rabbit was much higher at 41%. Since the chaining project, wildlife use still remains low. The chained area is very large, leaving little cover for wildlife. However, this area is most likely only used during severe winters. Pellet group transect data estimated only 2 deer days use/acre (5 ddu/ha) in 2002. Since the treatment, the area is also grazed by cattle which were in the area during the 2002 reading. Data estimated about 5 cow days use/acre (13 cdu/ha).

The soil is a fine clay loam that is limited in depth by a hardpan at a depth of about 13-15 inches. The effective rooting depth is estimated at 15 inches with a soil temperature of 57° F at that depth. There are very few rocks on the surface or within the soil profile. Soil reaction is neutral (pH 7.3). The amount of phosphorus in the soil is low at only 6.5 ppm, where 10 ppm is considered minimal for normal plant growth and development. There was a very high percentage of bare ground exposed on this site in 1997 (35%) with severely pedestalled grasses and dead sagebrush plants throughout the site. Since the chaining and seeding treatment, cover of bare ground has declined and litter cover has increased. Erosion that was apparent in 1997. It now appears stabilized and the erosion condition class was determined as stable in 2002.

Prior to the chaining, the site was dominated by juniper trees. In 1997, canopy cover for juniper averaged 31% with a density of 295 trees/acre (determined by the point-quarter method) and an average diameter of almost 5 inches. The abundant cover and density of juniper suppressed understory species. Mountain big sagebrush density was estimated at only 80 live plants/acre and these were all classified as decadent and dying. There were an estimated 1,220 dead plants/acre on the site. After the treatment, juniper canopy cover declined to about 8% and density dropped to 146 trees/acre (point quarter data). Average diameter of surviving trees was estimated at 3 inches. Just over half of the trees sampled were chained trees that were laying down but still alive. Density of mountain big sagebrush remained stable at 80 plants/acre but vigor improved dramatically and there is now a more balanced age structure. There are also a few scattered stickyleaf low rabbitbrush, cliffrose, and broom snakeweed on the site.

Prior to the chaining, total herbaceous cover was less than 9%, with the total cover for forbs coming to less than 1%. Sandberg and mutton bluegrass made up 80% of the herbaceous cover, indicating just how poor the site was for producing forage. After treatment, total herbaceous cover increased to 28% with the majority coming from seeded grasses, primarily crested wheatgrass. Other seeded grasses, intermediate wheatgrass, smooth brome, and Russian wildrye, occur in limited numbers. Total forb cover increased from 1% in 1997 to 6% in 2002. The forb composition is diverse but dominated by annuals, especially bur buttercup which provided 71% of the total forb cover in 2002. Seeded alfalfa has established and is the most abundant perennial forb on the site.

1997 APPARENT TREND ASSESSMENT

Soil condition is poor and it will remain so due to lack of herbaceous species and the high proportion of bare soil on the site. Litter cover is relatively low, but cryptogamic cover is high which helps to protect the bare soil. The trend for browse is obviously in a state of decline with the majority of the sagebrush population dead and the remainder dying. The mountain big sagebrush population for this site has been lost. The juniper provides excellent thermal and escape cover, but very little browse is available to wintering deer other than the juniper as an emergency food source. The herbaceous understory is also poor and depleted with most species in very low numbers and producing little forage. Any treatment should make sure that there is good establishment of a variety of competitive perennial grasses. Cheatgrass is found throughout the site in low numbers and the potential is there for it to take over the site without proper treatment and seeding of the site.

2002 TREND ASSESSMENT

Trend for soil is up. There is still a moderate amount of bare ground but litter cover has increased and vegetation cover has changed from mostly tree canopy cover to herbaceous cover. Total herbaceous cover has increased from 9% to 28%. Cryptogamic cover has declined dramatically, but herbaceous plants are much more effective at protecting against soil erosion. Trend for browse is up but density of key species is limited. Mountain big sagebrush has maintained a density of only 80 plants/acre. However, use has declined, vigor has improved dramatically, and the number of decadent plants has declined. Another positive factor for the browse trend is the removal of the once dominate juniper overstory. Juniper trees have been reduced from 295 plants/acre in 1997 to 146 plants/acre in 2002 (point quarter data). Canopy cover has been reduced from 31% to 8%. A further treatment of surviving trees should be considered to postpone a return to juniper dominance on this site. Trend for the herbaceous understory is up. Seeded grasses and forbs have established well and herbaceous cover has increased 3 fold. Crested wheatgrass is the most prominent species, providing 69% of the grass cover. The forb composition is diverse but dominated by annuals which is typical for the first few years after a treatment. Bur buttercup is by far the most abundant forb. Seeded alfalfa has established well and should persist if not heavily grazed.

TREND ASSESSMENT
soil - up (5)
browse - up but limited (5)
herbaceous understory - up (5)

HERBACEOUS TRENDS --
Herd unit 18 , Study no: 32

Type	Species	Nested Frequency '97	Nested Frequency '02	Quadrat Frequency '97	Quadrat Frequency '02	Average Cover % '97	Average Cover % '02
G	Agropyron cristatum	a-	b231	-	72	-	15.33
G	Agropyron intermedium	a-	b31	-	13	-	1.02
G	Agropyron spicatum	50	37	22	15	.43	1.60
G	Aristida purpurea	-	2	-	1	-	.00
G	Bromus inermis	-	4	-	2	-	.03
G	Bromus japonicus (a)	a-	b12	-	6	-	.03
G	Bromus tectorum (a)	a15	b90	6	35	.19	.79
G	Elymus junceus	-	-	-	-	-	.00
G	Poa bulbosa	-	-	-	-	-	.00
G	Poa fendleriana	b48	a-	14	-	1.43	-
G	Poa secunda	b277	a140	74	48	5.67	2.36
G	Sitanion hystrix	17	25	9	13	.16	.98
Total for Annual Grasses		15	102	6	41	0.19	0.81
Total for Perennial Grasses		392	470	119	164	7.72	21.36
Total for Grasses		407	572	125	205	7.92	22.18
F	Alyssum alyssoides (a)	a1	b84	1	31	.00	.66
F	Allium spp.	4	5	2	3	.01	.04
F	Antennaria rosea	2	9	1	5	.00	.05
F	Arabis spp.	1	-	1	-	.00	-
F	Astragalus convallarius	16	10	10	5	.28	.07

Type	Species	Nested Frequency '97	Nested Frequency '02	Quadrat Frequency '97	Quadrat Frequency '02	Average Cover % '97	Average Cover % '02
F	Astragalus spp.	-	1	-	1	-	.00
F	Camelina microcarpa (a)	-	1	-	1	-	.00
F	Collinsia parviflora (a)	33	21	10	7	.15	.03
F	Crepis acuminata	1	1	1	1	.03	.00
F	Cryptantha spp.	-	3	-	2	-	.03
F	Draba spp. (a)	3	-	1	-	.00	-
F	Epilobium brachycarpum (a)	$_{a}$-	$_{b}$14	-	8	-	.18
F	Gilia spp. (a)	-	3	-	1	-	.00
F	Heterotheca villosa	-	1	-	1	-	.00
F	Holosteum umbellatum (a)	1	-	1	-	.03	-
F	Lathyrus brachycalyx	$_{a}$5	$_{b}$16	2	6	.01	.13
F	Lactuca serriola	2	1	1	1	.00	.00
F	Medicago sativa	$_{a}$-	$_{b}$33	-	17	-	.23
F	Microsteris gracilis (a)	-	12	-	4	-	.02
F	Phlox hoodii	$_{b}$18	$_{a}$3	7	3	.28	.06
F	Phlox longifolia	$_{a}$2	$_{b}$8	1	4	.00	.02
F	Polygonum douglasii (a)	-	2	-	1	-	.00
F	Ranunculus testiculatus (a)	$_{a}$50	$_{b}$231	21	65	.13	4.04
F	Sisymbrium altissimum (a)	-	2	-	1	-	.03
F	Sphaeralcea coccinea	-	7	-	2	-	.01
F	Tragopogon dubius	-	-	-	-	-	.00
Total for Annual Forbs		88	370	34	119	0.32	4.99
Total for Perennial Forbs		51	98	26	51	0.63	0.69
Total for Forbs		139	468	60	170	0.95	5.68

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 18 , Study no: 32

Type	Species	Strip Frequency '97	Strip Frequency '02	Average Cover % '97	Average Cover % '02
B	Artemisia tridentata vaseyana	3	4	.18	.03
B	Gutierrezia sarothrae	1	5	-	.00
B	Juniperus osteosperma	24	14	16.54	5.28
Total for Browse		28	23	16.73	5.32

CANOPY COVER -- LINE INTERCEPT
Herd unit 18 , Study no: 32

Species	Percent Cover	
	'97	'02
Artemisia tridentata vaseyana	-	.25
Gutierrezia sarothrae	-	.05
Juniperus osteosperma	31	7.67

Key Browse Annual Leader Growth
Herd unit 18 , Study no: 32

Species	Average leader growth (in)
	'02
Artemisia tridentata vaseyana	3.2

Point-Quarter Tree Data
Herd unit 18 , Study no: 32

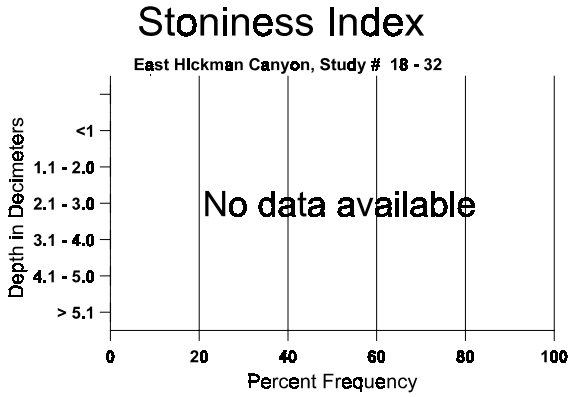
Species	Trees per Acre		Average diameter (in)	
	'97	'02	'97	'02
Juniperus osteosperma	295	146	5.0	3.2

BASIC COVER --
Herd unit 18 , Study no: 32

Cover Type	Nested Frequency		Average Cover %	
	'97	'02	'97	'02
Vegetation	356	406	26.19	32.68
Rock	57	35	1.12	.17
Pavement	211	208	4.89	4.38
Litter	458	476	30.51	47.92
Cryptogams	324	11	13.01	.09
Bare Ground	353	323	34.45	28.27

SOIL ANALYSIS DATA --
Herd Unit 18, Study no: 32, East Hickman Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.1	56.6 (15.3)	7.3	36.7	34.7	28.6	2.0	6.5	134.2	0.4



PELLET GROUP FREQUENCY --
Herd unit 18 , Study no: 32

Type	Quadrat Frequency		Pellet Transect			
			Pellet Groups per Acre		Days Use per Acre (ha)	
	'97	'02	'97	'02	'97	'02
Rabbit	41	31	-	-	-	-
Deer	13	4	26	26	2 (5)	2 (5)
Cattle	-	-	-	61	-	5 (13)

BROWSE CHARACTERISTICS --
Herd unit 18 , Study no: 32

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	1	-	-	-	-	-	1	-	-	2	-	-	-	40	18	23	2
D	97	1	-	3	-	-	-	-	-	-	-	-	-	4	80			4
	02	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	1220			61
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	75%	100%	+ 0%
'02	00%	00%	25%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	80	Dec:	100%
'02	80		25%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10	22	0
% Plants Showing			Moderate Use			Heavy Use			Poor Vigor						%Change			
	'97		00%			00%			00%									
	'02		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)													'97		0	Dec:		-
													'02		0			-
Cowania mexicana stansburiana																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	12	0
% Plants Showing			Moderate Use			Heavy Use			Poor Vigor						%Change			
	'97		00%			00%			00%									
	'02		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)													'97		0	Dec:		-
													'02		0			-
Gutierrezia sarothrae																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	02	3	-	-	-	-	-	2	-	-	5	-	-	-	100	8	15	5
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing			Moderate Use			Heavy Use			Poor Vigor						%Change			
	'97		00%			00%			00%						+83%			
	'02		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)													'97		20	Dec:		0%
													'02		120			17%
Juniperus osteosperma																		
S	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	97	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
	02	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
M	97	14	-	-	-	-	-	10	-	-	24	-	-	-	480	-	-	24
	02	8	-	-	-	-	-	-	-	-	4	-	4	-	160	52	35	8
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	2	-	-	-	-	-	-	-	-	-	-	2	-	40			2
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	240			12
% Plants Showing			Moderate Use			Heavy Use			Poor Vigor						%Change			
	'97		00%			00%			00%						-44%			
	'02		00%			00%			40%									
Total Plants/Acre (excluding Dead & Seedlings)													'97		540	Dec:		0%
													'02		300			13%